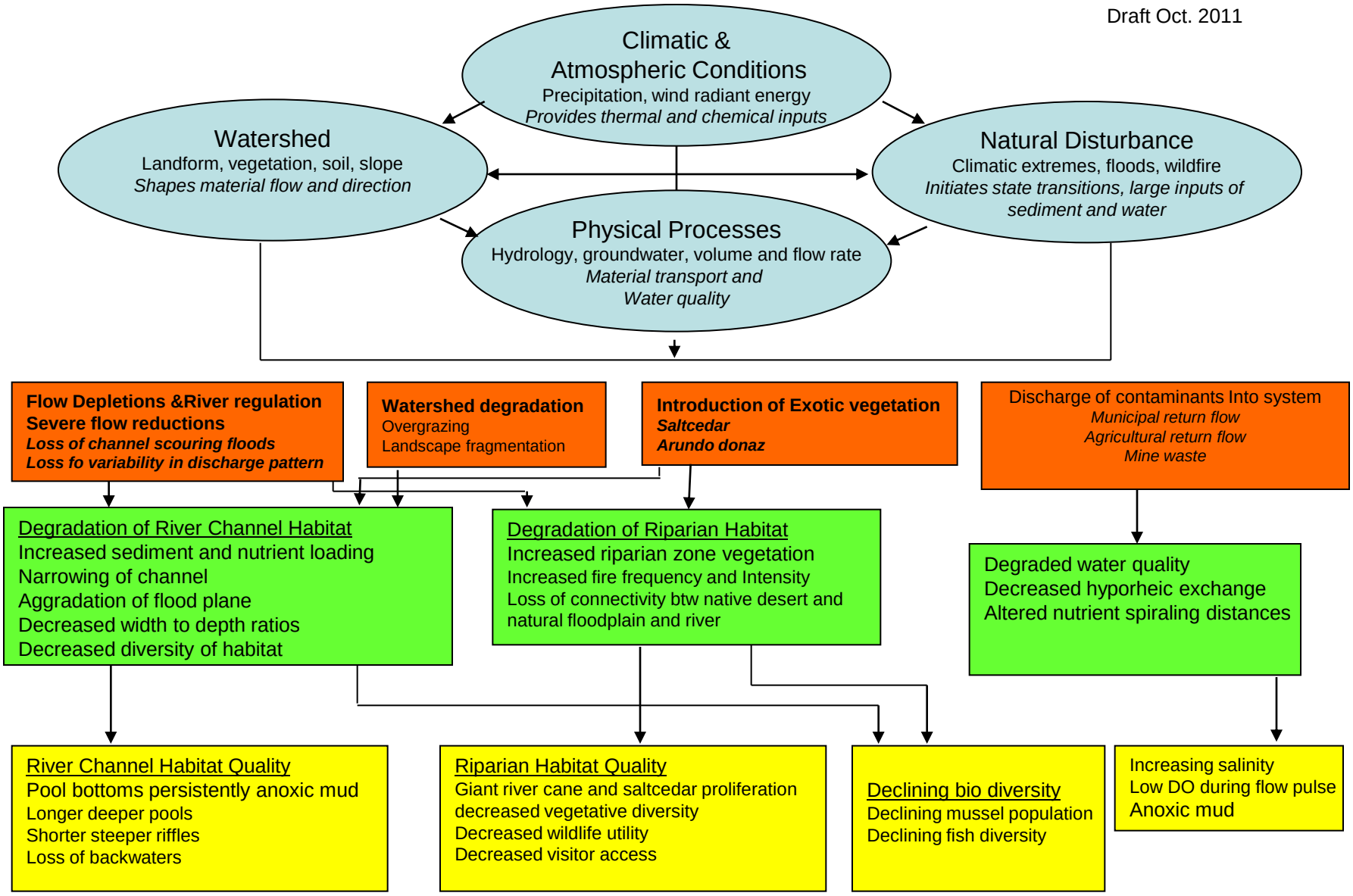
Conceptual Model of the Rio Grande below Redford to Foster's Weir.

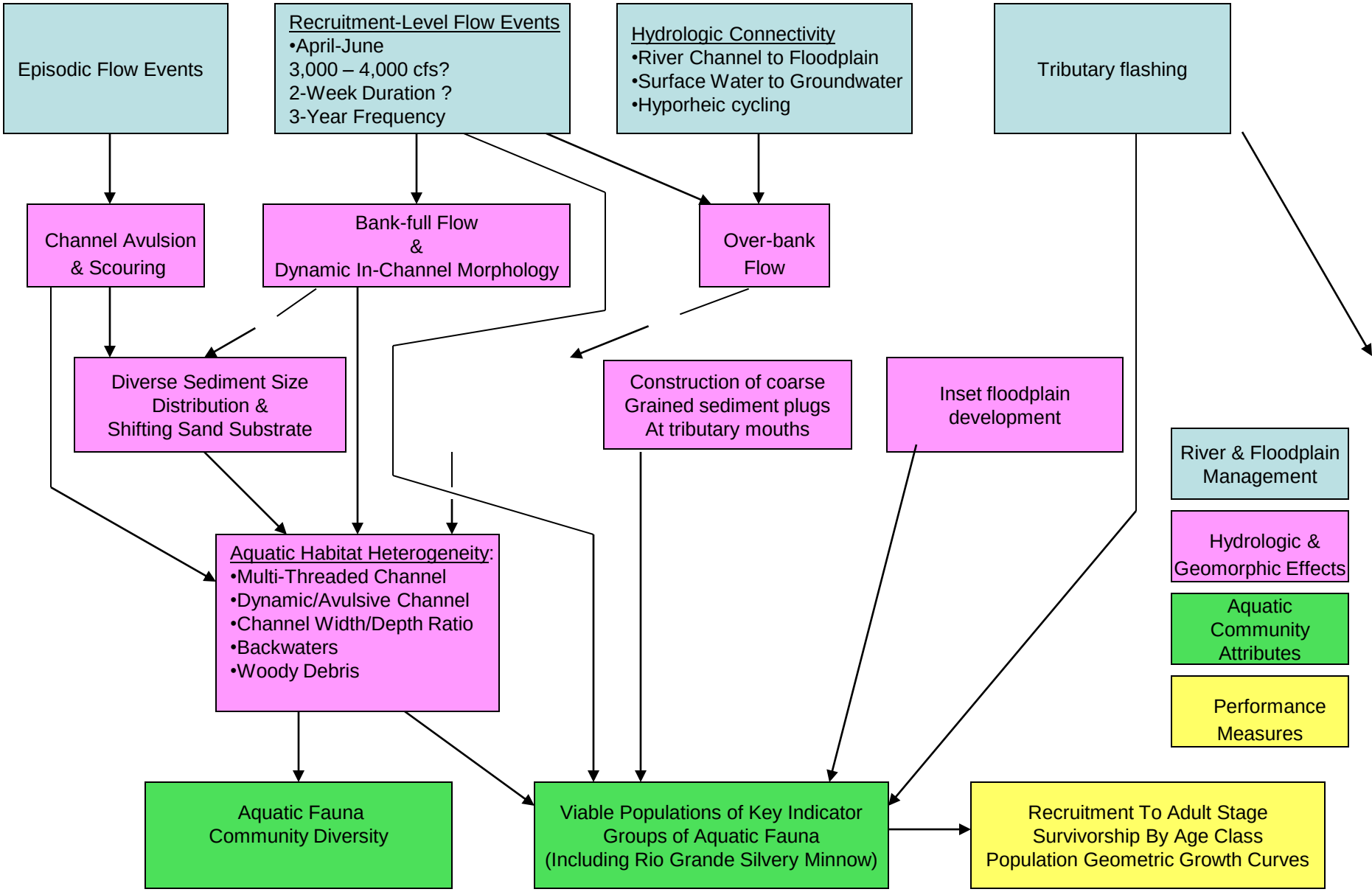
Draft Oct. 2011



Adapted from Groeger (2008) and Ibis Ecosystem Associates (2007)

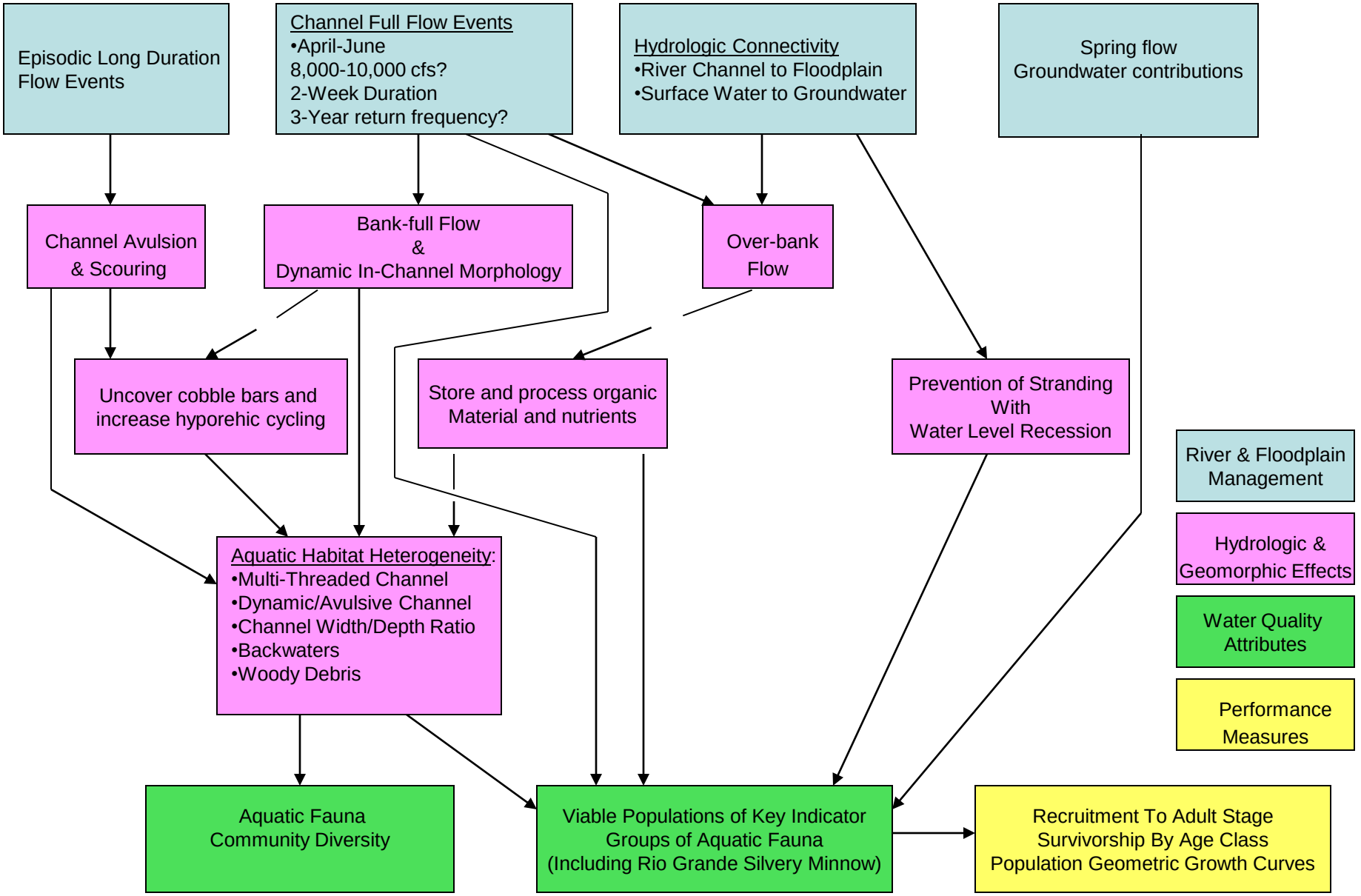
driver | stressor | effect | attribute

Conceptual Ecological Model of Working Hypotheses
Aquatic Communities
Big Bend Reach of Rio Grande River



Adapted from Groeger (2008) and Ibis Ecosystem Associates (2007)

Conceptual Ecological Model of Working Hypotheses
Water Quality
Big Bend Reach of Rio Grande River



Adapted from Groeger (2008) and Ibis Ecosystem Associates (2007)

From Guadalupe BBEST report

Component	Hydrology	Geomorphology	Biology	Water Quality
No-Flow Periods	Flow ceases between perennial pools		Generally stressful for fish communities	Temperatures rise and oxygen levels decrease. These condition sometimes cause fish kills
Subsistence Flows	Infrequent low flows	Increased deposition of fine and organic particles	Provide restricted aquatic habitat limit connectivity	Elevate temperature and constituent concentrations Maintain adequate levels of dissolved oxygen
Base Flows	Average flow condition, including variability	Maintain soil moisture and groundwater table Maintain a diversity of habitats	Provide suitable aquatic habitat, Provide connectivity along channel corridor	Provide suitable in-channel water quality
High Flow Pulses	In channel short duration, high flows	Maintain channel and substrate characteristics; Prevent encroachment of riparian vegetation	Serve as recruitment events for organisms; Provide connectivity to near-channel water bodies	Restore in-channel water quality after prolonged low flow periods.
Overbank flows	Infrequent high flows that exceed the channel	Provide lateral channel movement and floodplain maintenance; Recharge floodplain water table; form new habitats; flush organic material into channel; Deposit nutrients in floodplain	Provide new life phase cues for organisms; Maintain diversity of riparian vegetation; Provide conditions for seedling development; Provide connectivity to floodplain	Restore water quality in floodplain water bodies
Channel Maintenance	For most streams, channel maintenance occurs mostly during pulse and overbank flows	Long-term maintenance of existing channel morphology	Maintains foundation for physical habitat features instream	Water quality condition like those during pulse overbank flows